Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

1-13 (Canceled)

14. (Currently Amended) A process for forming an integral, unsupported, multizone microporous membrane having at least two zones, comprising the acts of:

operatively positioning relative to a continuously moving coating surface at least one polymer applying apparatus having at least two polymer dispensing outlets in chambers with a front wall and a back wall and a separating wall between the front wall and the back wall defining the volumes of the chambers;

~~cooperatively applying~~ co-casting polymer from each of the polymer dispensing outlets onto the continuously moving coating surface so as to create a multiple layer polymer coating on the coating surface, wherein the polymer is dispensed from the chambers by gravity, fluid pressure, or pumping;

subjecting the multiple polymer layer coating to a phase separation procedure so as to form a wet multizone microporous membrane; and

separating the wet multizone microporous membrane from the continuously moving coating surface at some point prior to complete drying of the membrane.

15. (Currently Amended) A process for forming an integral, unsupported, multizone microporous membrane having at least two zones, comprising the acts of:

operatively positioning at least one polymer applying apparatus having at least two polymer dispensing outlets relative to a continuously moving coating surface;

~~cooperatively applying~~ co-casting polymer from each of the polymer dispensing outlets onto the continuously moving coating surface so as to create a multiple layer polymer coating on the coating surface, wherein the thicknesses of each layer can be controlled by one or more factors selected from the group consisting of gap distance, solution viscosity, coating surface speed, polymer fluid pressure, and pumping of polymer solutions through the polymer dispensing outlets;

subjecting the multiple polymer layer coating to a phase separation procedure so as to form a wet multizone microporous membrane; and

separating the wet multizone microporous membrane from the continuously moving coating surface at some point prior to complete drying of the membrane.

16. (Currently Amended) An integral, unsupported, multizone microporous membrane having at least two zones prepared by a process comprising the acts of:

operatively positioning relative to a continuously moving coating surface at least one polymer applying apparatus having at least two polymer dispensing outlets in chambers with a front wall and a back wall and a separating wall between the front wall and the back wall defining the volumes of the chambers;

~~cooperatively applying~~ co-casting polymer from each of the polymer dispensing outlets onto the continuously moving coating surface so as to create a multiple layer polymer coating on the coating surface, wherein the polymer is dispensed from the chambers by gravity, fluid pressure, or pumping;

subjecting the multiple polymer layer coating to a phase separation procedure so as to form a wet multizone microporous membrane; and

separating the wet multizone microporous membrane from the continuously moving coating surface at some point prior to complete drying of the membrane.

17. (Currently Amended) An integral, unsupported, multizone microporous membrane having at least two zones prepared by a process comprising the acts of:

operatively positioning at least one polymer applying apparatus having at least two polymer dispensing outlets relative to a continuously moving coating surface;

~~cooperatively applying~~ co-casting polymer from each of the polymer dispensing outlets onto the continuously moving coating surface so as to create a multiple layer polymer coating on the coating surface, wherein the thicknesses of each layer can be controlled by one or more factors selected from the group consisting of gap distance, solution viscosity, coating surface speed, polymer fluid pressure, and pumping of polymer solutions through the polymer dispensing outlets;

subjecting the multiple polymer layer coating to a phase separation procedure so as to form a wet multizone microporous membrane; and

separating the wet multizone microporous membrane from the continuously moving coating surface at some point prior to complete drying of the membrane.

18. (Currently Amended) A process for forming an unsupported, multizone microporous membrane having at least two zones, comprising the acts of:

operatively positioning at least one polymer applying apparatus having at least two polymer dispensing outlets relative to a coating surface;

~~cooperatively applying~~ co-casting polymer from each of the polymer dispensing outlets onto the coating surface so as to create a multiple layer polymer coating on the coating surface, wherein the polymer is dispensed from the chambers by gravity, fluid pressure or pumping;

subjecting the multiple polymer layer coating to a phase separation procedure so as to form a wet multizone microporous membrane; and

separating the wet multizone microporous membrane from the coating surface at some point prior to complete drying of the membrane.

19. (Currently Amended) A process for forming an unsupported, multizone microporous membrane having at least two zones, comprising the acts of:

operatively positioning at least one polymer applying apparatus having at least two polymer dispensing outlets relative to a coating surface;

~~cooperatively applying~~ co-casting polymer from each of the polymer dispensing outlets onto the coating surface so as to create a multiple layer polymer coating on the coating surface, wherein the thicknesses of each layer can be controlled by one or more factors selected from the group consisting of gap distance, solution viscosity, coating surface speed, polymer fluid pressure, and pumping of polymer solutions through the polymer dispensing outlets;

subjecting the multiple polymer layer coating to a phase separation procedure so as to form a wet multizone microporous membrane; and

separating the wet multizone microporous membrane from the coating surface at some point prior to complete drying of the membrane.

20. (Currently Amended) An unsupported, multizone microporous membrane having at least two zones prepared by a process comprising the acts of:

operatively positioning relative to a coating surface at least one polymer applying apparatus having at least two polymer dispensing outlets in chambers with a front

wall and a back wall and a separating wall between the front wall and the back wall defining the volumes of the chambers;

~~cooperatively applying~~ co-casting polymer from each of the polymer dispensing outlets onto the coating surface so as to create a multiple layer polymer coating on the coating surface, wherein polymer is dispensed from the chambers by gravity, fluid pressure, or pumping;

subjecting the multiple polymer layer coating to a phase separation procedure so as to form a wet multizone microporous membrane; and

separating the wet multizone microporous membrane from the coating surface.

21. (Currently Amended) An unsupported, multizone microporous membrane having at least two zones prepared by a process comprising of the acts of:

operatively positioning at least one polymer applying apparatus having at least two polymer dispensing outlets relative to a coating surface;

~~cooperatively applying~~ co-casting polymer from each of the polymer dispensing outlets onto the coating surface so as to create a multiple layer polymer coating on the coating surface, wherein the thicknesses of each layer can be controlled by one or more factors selected from the group consisting of gap distance, solution viscosity, coating surface speed, polymer fluid pressure, and pumping of polymer through the polymer dispensing outlets;

subjecting the multiple polymer layer coating to a phase separation procedure so as to form a wet multizone microporous membrane; and

separating the wet multizone microporous membrane from the coating surface.

22. (Previously Presented) The process of claim 14 or 18, wherein the polymer is dispensed from the chambers using fluid pressure or pumping.

23. (Previously Presented) The process of claim 14 or 18, wherein the back wall is held above the continuously moving coating surface to form a back wall gap, and said back wall gap, surface speed, and polymer solution viscosity are adjusted to prevent the polymer solution from leaking out through the back wall gap.

24. (Previously Presented) The process of claim 23, wherein the polymer is dispensed from the chambers using fluid pressure.

25. (Previously Presented) The process of claim 23, wherein the polymer is dispensed from the chambers using pumping.

26. (Previously Presented) The membrane of claim 16 or 20, wherein the membrane is prepared by having a polymer dispensed from the chambers using fluid pressure or pumping.

27. (Previously Presented) The membrane of claim 16, wherein the membrane is prepared by having the back wall held above the continuously moving coating support to form a back wall gap, and said back wall gap, coating surface speed, and polymer solution viscosity are adjusted to prevent the polymer solution from leaking out through the back wall gap.

28. (Previously Presented) The membrane of claim 27, wherein the membrane is prepared by having a polymer dispensed from the chambers using fluid pressure.

29. (Previously Presented) The membrane of claim 27, wherein the membrane is prepared by having the polymer dispensed from the chambers using pumping.

30. (Currently Amended) The process of claim 14 or 18~~, wherein the chambers can be heated or cooled~~ further comprising:

heating or cooling the chambers.

31. (Previously Presented) The process of claim 14 or 18, wherein the polymer comprises:

nylon.

32. (Previously Presented) The process of claim 14 or 18, wherein the polymer comprises:

polyvinylidene fluoride.

33. (Previously Presented) The process of claim 14 or 18, wherein the polymer comprises:

polyethersulfone.

34. (Previously Presented) The process of claim 14 or 18 further comprising the acts of:

washing and drying the membrane.

35. (Previously Presented) The process of claim 14 or 18, wherein the zones of the multizone microporous membrane have different pore sizes.

36. (Previously Presented) The membrane of claim 16 or 20, wherein the membrane can be prepared by having the chambers heated or cooled.

37. (Previously Presented) The membrane of claim 16 or 20, wherein the polymer comprises:

nylon.

38. (Previously Presented) The membrane of claim 16 or 20, wherein the polymer comprises:

polyvinylidene fluoride.

39. (Previously Presented) The membrane of claim 16 or 20, wherein the polymer comprises:

polyethersulfone.

40. (Previously Presented) The membrane of claim 16 or 20, wherein the membrane is prepared by a process further comprising the acts of:

washing and drying the membrane.

41. (Previously Presented) The membrane of claim 16 or 20, wherein the zones of the multizone microporous membrane have different pore sizes.

42. (Previously Presented) The process of claim 15 or 19, wherein the thicknesses of the layers are controlled by factors selected from the group consisting of solution viscosity, coating surface speed, polymer fluid pressure, and pumping of polymer solutions through the polymer dispensing outlets.

43. (Previously Presented) The process of claim 15 or 19, wherein the solution viscosity is controlled by heating or cooling of the chambers.

44. (Canceled)

45. (Previously Presented) The membrane of claim 17, wherein the membrane is prepared by having the thicknesses of the layers controlled by factors selected from the group consisting of solution viscosity, coating surface speed, polymer fluid pressure, and pumping of polymer solutions through the polymer dispensing outlets.

46. (Previously Presented) The membrane of claim 21, wherein the membrane is prepared by having the thicknesses of the layers controlled by factors selected from the group consisting of solution viscosity, polymer fluid pressure, and pumping of polymer solutions through the polymer dispensing outlets.

47. (Previously Presented) The membrane of claim 17 or 21, wherein the solution viscosity is controlled by heating or cooling of the chambers.

48. (Canceled)

49. (Currently Amended) A process for forming an integral, unsupported, multizone microporous membrane having at least two zones, comprising the acts of:

operatively positioning relative to a continuously moving coating surface at least one polymer applying apparatus having at least two polymer dispensing outlets in chambers with a front wall and a back wall and a separating wall between the front wall and the back wall defining the volumes of the chambers, wherein polymer solution is pumped into the polymer applying apparatus;

~~cooperatively applying~~ co-casting polymer from each of the polymer dispensing outlets onto the continuously moving coating surface so as to create a multiple

layer polymer coating on the coating surface, wherein the polymer is dispensed from the chambers;

subjecting the multiple polymer layer coating to a phase separation procedure so as to form a wet multizone microporous membrane; and

separating the wet multizone microporous membrane from the continuously moving coating surface at some point prior to complete drying of the membrane.

50. (Currently Amended) A process for forming an integral, unsupported, multizone microporous membrane having at least two zones, comprising the acts of:

operatively positioning at least one polymer applying apparatus having at least two polymer dispensing outlets relative to a continuously moving coating surface, wherein polymer is pumped into the polymer applying apparatus;

~~cooperatively applying~~ co-casting polymer from each of the polymer dispensing outlets onto the continuously moving coating surface so as to create a multiple layer polymer coating on the coating surface;

subjecting the multiple polymer layer coating to a phase separation procedure so as to form a wet multizone microporous membrane; and

separating the wet multizone microporous membrane from the continuously moving coating surface at some point prior to complete drying of the membrane.

51. (Currently Amended) A process for forming an unsupported, multizone microporous membrane having at least two zones, comprising the acts of:

operatively positioning at least one polymer applying apparatus having at least two polymer dispensing outlets relative to a coating surface, wherein polymer is pumped into the polymer applying apparatus;

~~cooperatively applying~~ co-casting polymer from each of the polymer dispensing outlets onto the coating surface so as to create a multiple layer polymer coating on the coating surface;

subjecting the multiple polymer layer coating to a phase separation procedure so as to form a wet multizone microporous membrane; and

separating the wet multizone microporous membrane from the coating surface at some point prior to complete drying of the membrane.

52. (Currently Amended) A process for forming an unsupported, multizone microporous membrane having at least two zones, comprising the acts of:

operatively positioning at least one polymer applying apparatus having at least two polymer dispensing outlets relative to a coating surface, wherein polymer is pumped into the polymer applying apparatus;

~~cooperatively applying~~ co-casting polymer from each of the polymer dispensing outlets onto the coating surface so as to create a multiple layer polymer coating on the coating surface;

subjecting the multiple polymer layer coating to a phase separation procedure so as to form a wet multizone microporous membrane; and

separating the wet multizone microporous membrane from the coating surface at some point prior to complete drying of the membrane.